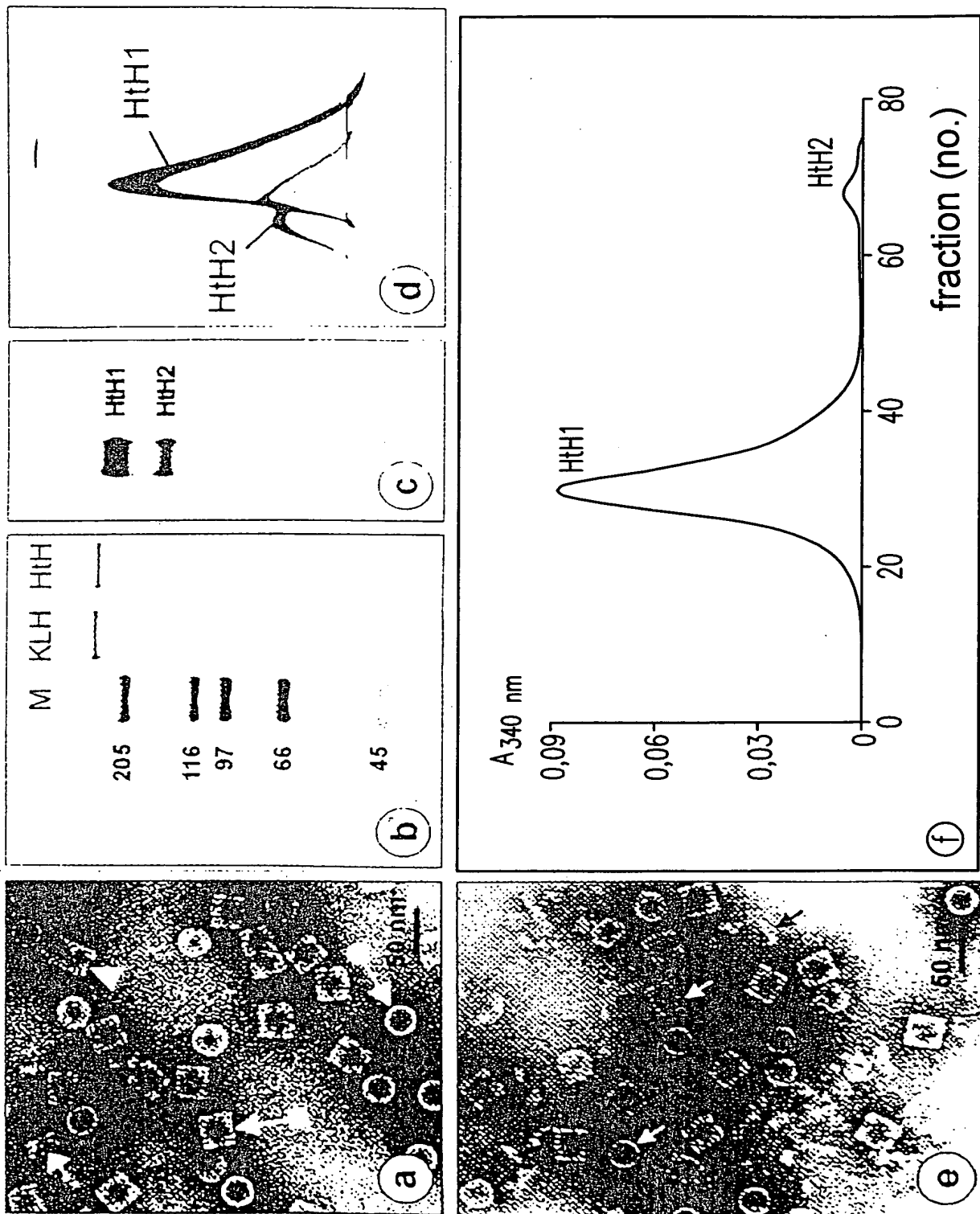
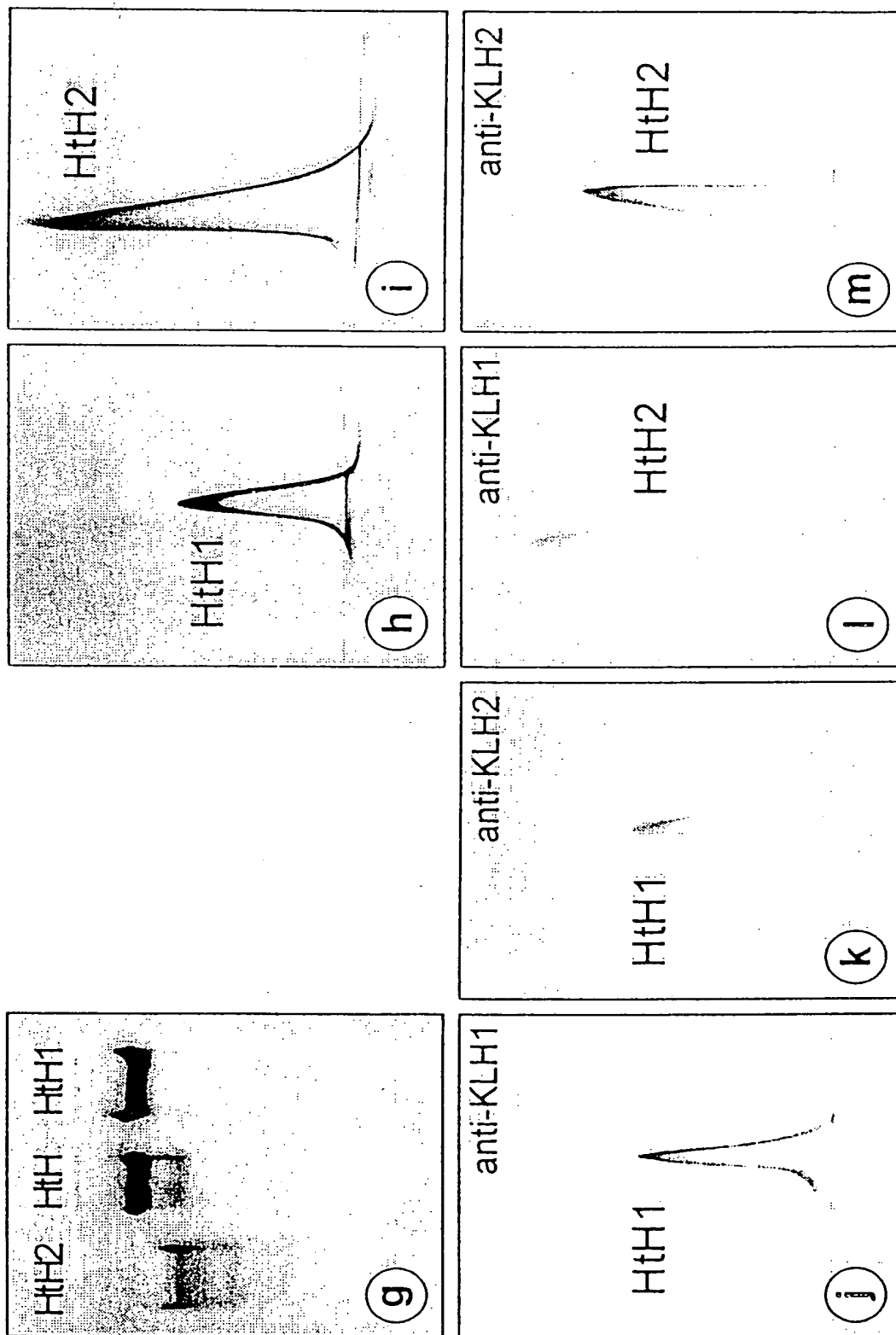


Fig. 1a-f



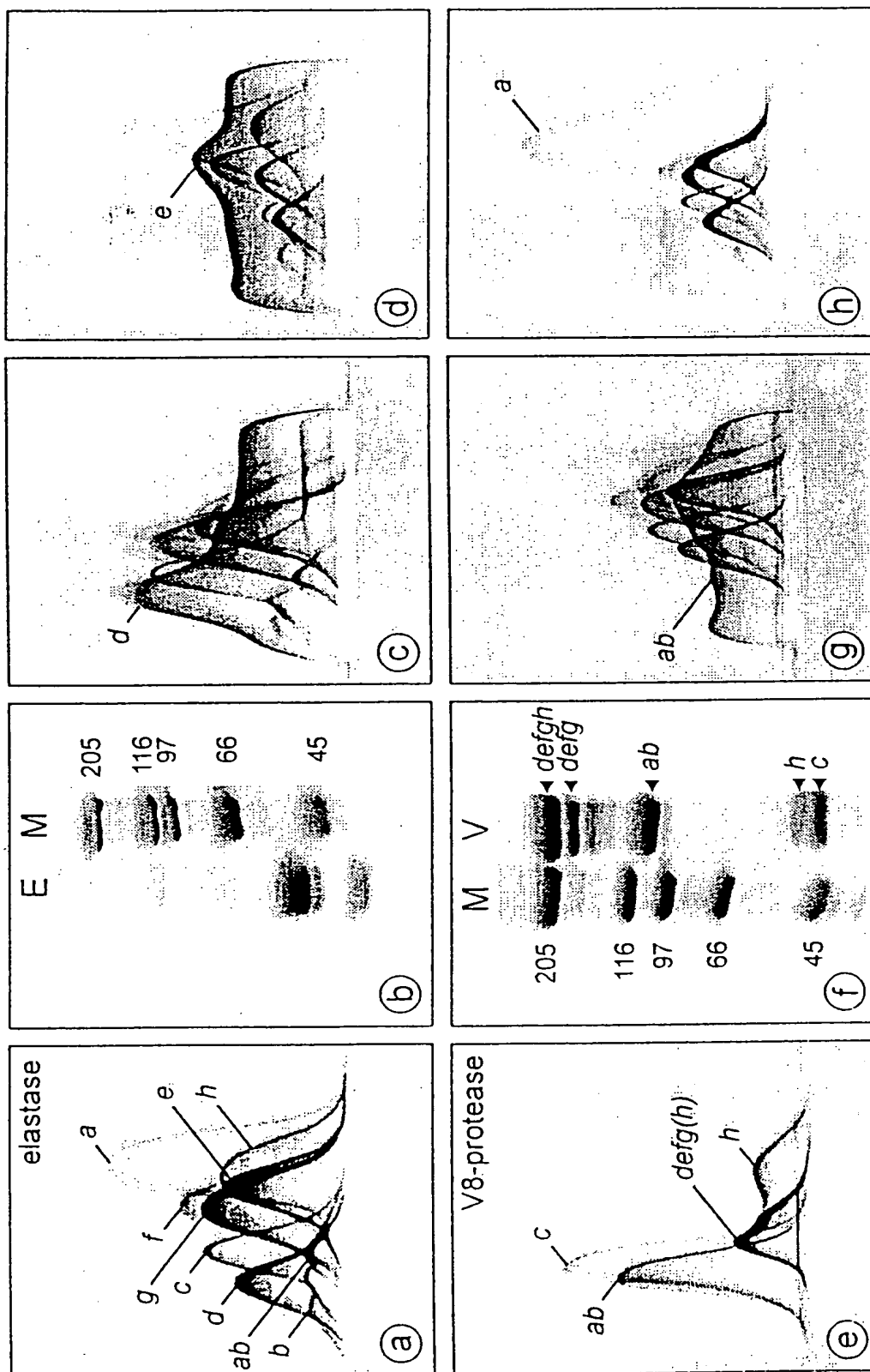
2/29

Fig. 1g-m



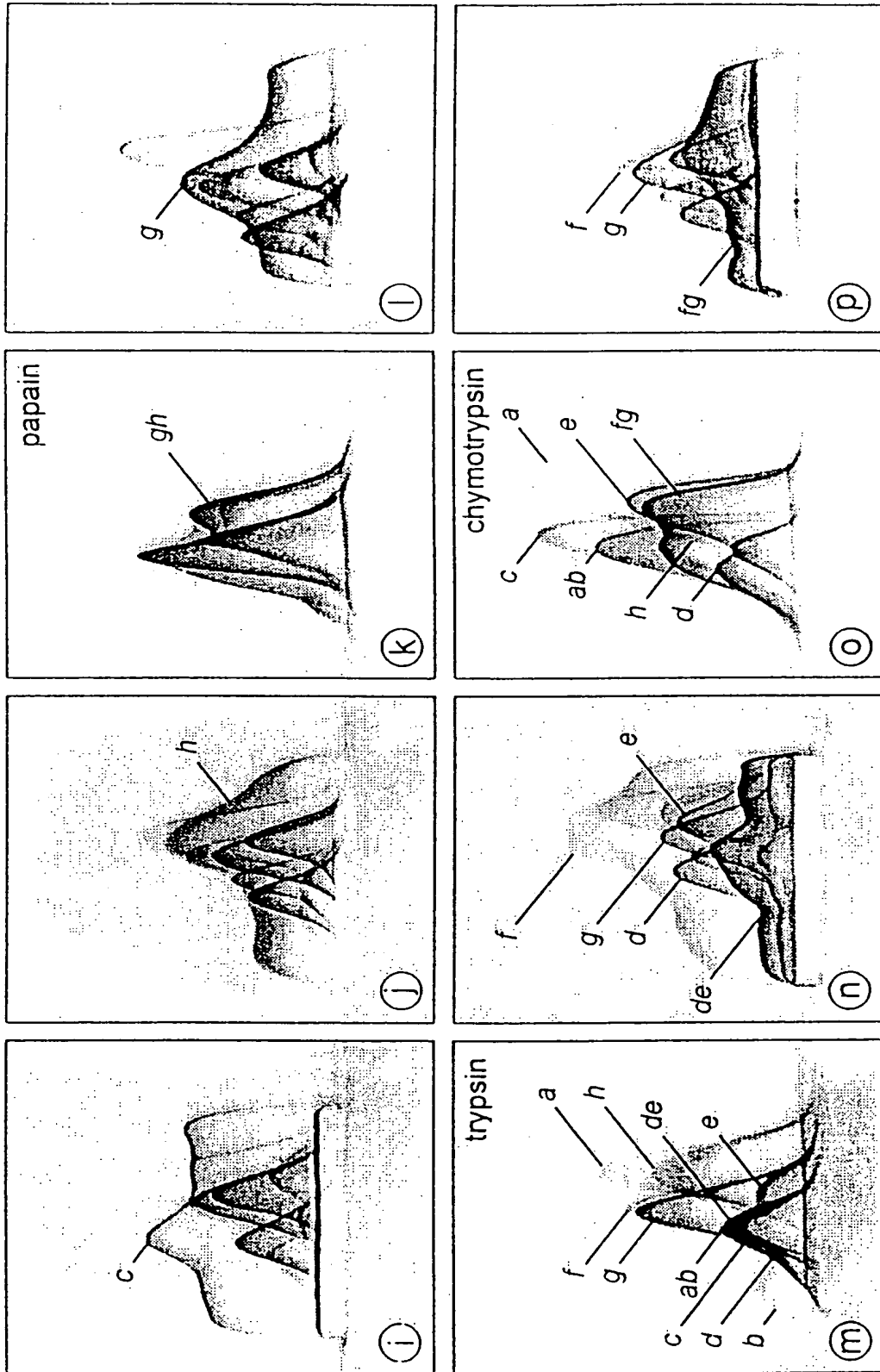
3/29

Fig. 2a-h



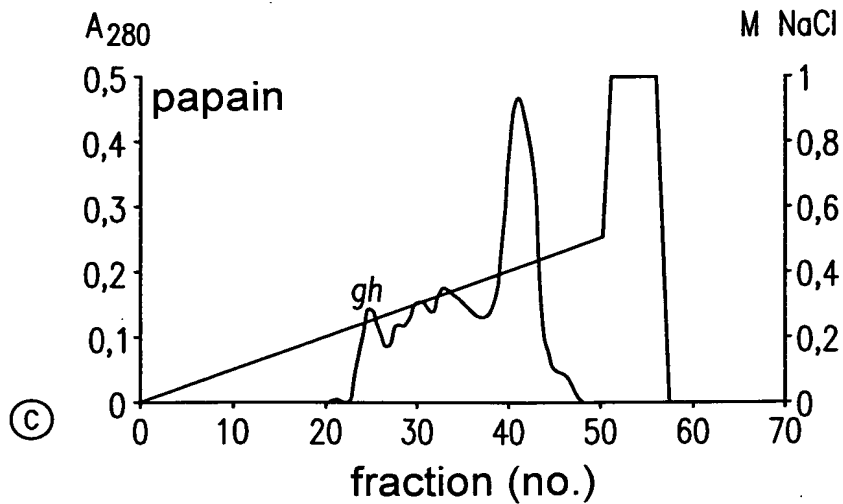
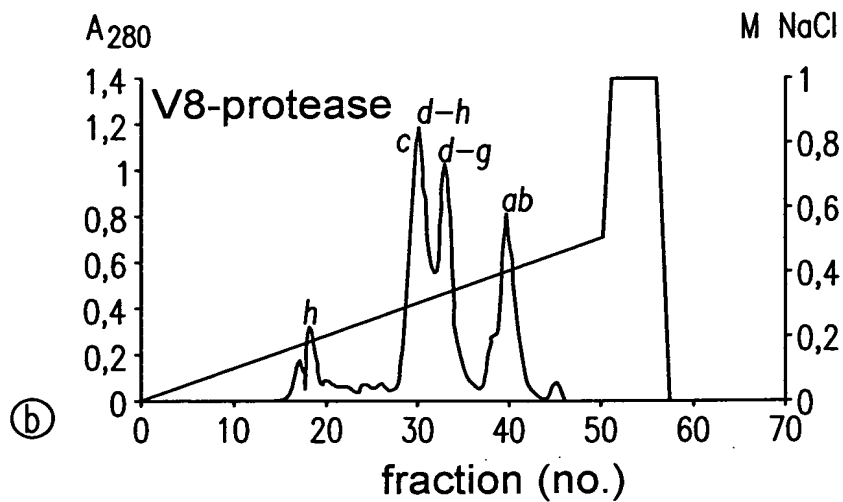
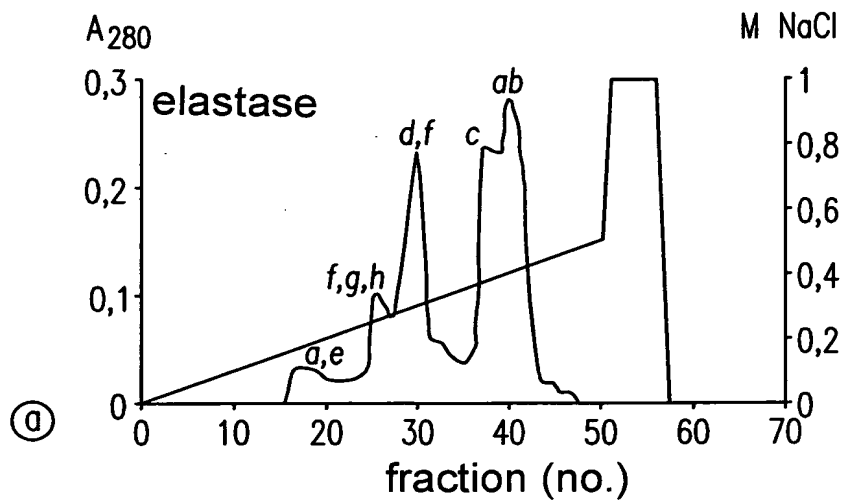
4/29

Fig. 2i-p



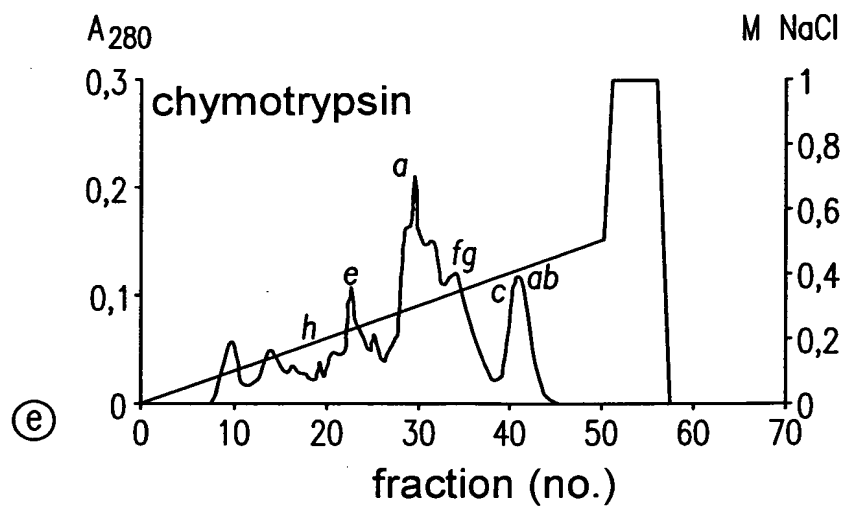
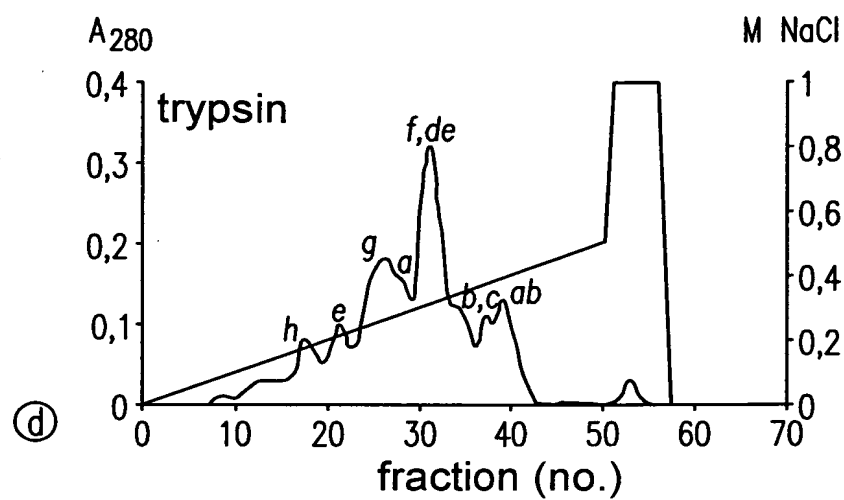
5/29

Fig. 3a-c



6/29

Fig. 3d-e



REPLACEMENT SHEET NO. 7

7/29

Figure 4

HtH1 cDNA sequence and intron structure

Domain a

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TCACCTGATCTTCTTCTCAACCAACTGTTGCCTACCGACCTGGGAAAG

Domain b

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REPLACEMENT SHEET NO. 8

8/29

Intron b/c

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Domain c

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Intron c/d

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Domain d

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REPLACEMENT SHEET NO. 9

9/29

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Intron d/e

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Domain e

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Intron e/f

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REPLACEMENT SHEET NO. 10

10/29

Domain f

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Intron f(1)

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Intron f/g

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REPLACEMENT SHEET NO. 11

11/29

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Intron g(2)

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Domain g(2)

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Intron g/h

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REPLACEMENT SHEET NO. 12

12/29

Domain h

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3' UTR

TTCACAG

Intron UTR

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3' UTR

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CGCCAAGTGATGTGTAGGTCACGGAAGTATTGTTGAGCTAACAATATGATGATTTCAAAT
GACTTGGCGCTCTAGGACAAAGACATAATTCATCAGCACCCCTGTGCACCAACTCTTTGTTT
GCTGCAAACGTCTGACAAGCGACACGTCAATCAACAAGCTGTTCAAACCTCAAGTGGATGTA
ACTAGAATCGTTGGGCCATCGTTCAAAAGTATTGACAGATGTCACACATGATGGCGAGAA
ACACTTTAGAACTTTTAAATGACCTAGAGTGACTTGTAAATATGTAATATATTCTTCAAAG
ACTCAGCTGAACATATTGTTGGATAACACATCAATTCCTCAACAAATGCTTTATCTTCAC
ATGGATGTATGTAATGTGGCCGGCAATAAAGTATATATATGTATAAAAAAAAAAAAAAAAAA
A

REPLACEMENT SHEET NO. 13

13/29

Figure 5

Derived primary structure of HtH1

Signal peptide

LVQFLLVAGAGA

Domain a

DNVVRKDVSHLTDDEVQALHGALHDVTASTGPLSFEDITSYHAAPASCDYKGRKIACCVHG
MPSFPFWHRAYVQAEALLSKRKTVGMPYWDWTQTLTHLPSLVTEPIYIDSKGGKAQTN
WYRGEIAFINKKTARAVDDRLFEKVEPGHYTHLMETVLDALQDEFCKFEIQFELAHNAIH
YLVGGKFEYSMSNLEYTSYDPIFFLHHSNVDRLFAIWQRLQELRGKNPNAMDCAHDLAQ
LQPFNRDSNPVQLTKDHSTPADLFDYKQLGYSYDSLNLNGMTPEQLKTELDERHSKERAF
SFRLSGFGGSANVVYACVPDDPRSDDYCEKAGDFFILGGQSEMPWRFYRPFYDVTEAV
HHLGVPLSGHYVKTFLSVNGTALSPDLLPQPTVAYRPGK

Domain b

GHLDPPVHHRHDDDLIVRKNIDHLTREEEYELRMALERFQADTSVDGYQATVEYHGLPARC
PRPDAKVRFACCMHGMASFPHWHRLFVTQVEDALVRRGSPIGVPYWDWTKPMTHLPDLASN
ETYVDPYGHTHHNPFNFNANISFEEGHHHTSRMIDSKLFAPVAFGEHSHLFDGILYAFEQED
FCDFEIQFELVHNSIHAWIGGSEDYSMATLHYTAFDPIFYLHHSNVDRLWAIWQALQIRRH
KPYQAHCAQSVEQLPMKPFAPPSPLNNNEKTHSHSVPTDIYDYEEVLHYSYDDLTFGGMNL
EEIEEAHLRQQHERVFAGFLLAGIGTSALVDIFINKPGNQPLKAGDIAILGGAKEMPWAF
DRLYKVEITDSLKTLSDVDGDYEVTFKIHDHMGNALDLDLIPHAADVSEPAH

Domain c

PTFEDEKHSLRIRKNVDSLTPETNELRKALELLENDHTAGGFNQLGAFHGEPKWCPNPEA
EHKVACCVHGMVFPWHRLALQAENALRKHGYS GALPYWDWTRPLSQLPDLVSHEQYTD
PSDHHVKHNPWFNGHIDTVNQDTRSVREDLYQQPEFGHFTDIAQQVLLALEQDDFCSEV
QYEISHNFIHALVGGTDAYGMASLRYTAYDPIFFLHHSNTDRIWAIWQSLQYRGKPYNTA
NCAIESMRRLQPFGLSSAINPDRI TREHAIPFDVFNRYRDNLHYVYDTLEFNGLSISQLDR
ELEKIKSHERVFAGFLLSGIKKSALVKFEVCTPPDNCHKAGEFYLLGDENEMAWAYDRLFK
YDITQVLEANHLHFYDHLFIRYEVFDLKGVS LGTDLFHTANVVHDSGT

Domain d

GTRDRDNYVEEVTGASHIRKNLNDLNTGEMESLRAAFLHIQDDGTYESIAQYHGKPGKCQL
NDHNIACCVHGMPTFPQWHRLYVQVENALLNRGSGVAVPYWEWTAPIDHLPHFIDDATYF
NSRQQRYDPNPFPRGKVT FENAVTTRDPQAGLFNSDYMYENVLLALEQENYCDFEIQFELV
HNALHSM LGGKGQYSMSLDYS AFDPVFFLHHANTDRLWAIWQELQRFRELPYEEANCAN
LMHQPLKPFSDPHENHDNVT LKYSKPQDGFQYQNHFGYKYDNLEFHLSIPSLDATLKQRR
NHDRV FAGFLLHNIGTSADITIYICLPDGRRGNDCSHEAGTFYILGGETEMPFI FDRLYKF
EITKPLQQLGVKLHGGVFELELEIKAYNGSYLDPHTFDPTIIFEPGT

Domain e

REPLACEMENT SHEET NO. 14

14/29

DTHILDHDHEEEIILVRKNIIDLSPRERVSLVKALQRMKNDRSADGYQAIASFHALPPLCPN
PSAAHRYACCVHGMATFPQWHRLYTVQVQDALRRHGSLVGI PYWDWTKPVNELPELLSSAT
FYHPIRNINISNPFLGADIEFEGPGVHINTERLRFHSGDHDGYHNWFFETVLFALQE
DYCDFEIQFEIAHNGIHTWIGGSVAVYGMGHLHYASYDPIFYIHHSQTDRIWAIWQELQKYR
GLSGSEANCAIEHMRTPPKPFSFGPPYNLNSHTQEYSKPEDTFDYKKFGYRYDSLELEGRS
ISRIDELIQQRQEKDRTFAGFLLKGFGTSASVSLQVCRVDHTCKDAGYFTILGGSAAEMPWA
FDRLYKYDITKTLHDMNLRHEDTFSIDVTITSYNGTVLSGDLIQTPSIIFVPGR

Domain f

HKLNSRKHTPNRVRHELSSLSSRDIAASLKAALTSLOHDNGTDGYQAIAAFHGVPAQCHEPS
GREIACCIHGMATFPHWHRLYTLQLEQALRRHGSSVAVPYWDWTKPITELPHILTDGEYYD
VWQNAVLANPFARGYVKIKDAFTVRNVQESLFRKSSFGKHSLLFDQALLALEQTDYCDFEV
QFEVMHNTIHYLVGGRTYAFSSLEYSSYDPIFFIHHSFVDKIWAVWQELQSRRLQFRTA
DCAVGLMGQAMRPFNKDFNHSFTKKHAVPNTVFDYEDLGYNNDNLEISGLNLNEIEALIA
KRKSHARVFAGFLLFGLGTSADIHLEICKTSENCHDAGVIFILGGSAAEMHWAYNRLYKYDI
TEALQEFDINPEDVFHADEPFPLRLSVVAVNGTVIPSSHLHQPTIIYEPGE

Domain g

DHHDDHQSGSIAAGSGVRKDVNTLTKAETDNLREALWGVMAHGPNGFQAIAAFHGKPALCP
MPDGHNYSCCTHGMATFPHWHRLYTKQMEDAMRAHGSHVGLPYWDWTAFTHLPTLVTDTD
NNPFQHGHI DYLVNSTTRS PRDMLFNDPEHGSESFYRQVLLALEQTD FCKFEVQFEITHN
AIHSWTGGHSPYGMSTLDFTAYDPLFWLHHSNTDRIWAVWQALQEYRGLPYNHANCEIQAM
KTPLRPFSDDINHNPVTKANAKPLDVFEYNRLSFQYDNLI FHGYSIPELDRVLEERKEEDR
IFAAFLLSGIKRSADVVDICQPEHECVFAGTFAILGGELEMPWSFDRLFRYDITKVMKQL
HLRHDSDFTRVKIVGTDDHELPSDSVKAPTIEFEPG

Domain h

VHRGGNHEDEHDDRLADVLRKEVDFLSLQEANA IKDALYKLQND DSKGGFEAIAGYHGY
PNMCPERGTDKYPCCVHGMPVFPHWHRLHTIQMERALKNHGSPMGI PYWDWTKKMSSLPSF
FGDSSNNNPFYKYIIRGVQHETTRDVNQRLFNQTKFGEFDYLYLTQVLEENSYCDFEVQ
YEILHNAVHSWLGGTGQYSMTLEYSADFVPMIHHSSLDRIWILWQKLQKIRMKPYALD
CAGDRLMKDPLHPFNYETVNEDEFTRINSFPSILFDHYRFNYEYDNMRIRGQDIHELEEV
QELRNKDRI FAGFVLSGLRISATVKVFIH SKNDTSHEEYAGEFAVLGGEKEMPWAYERMLK
LDISDAVHKLHVKDEDIRFRVVVTAYNGDVVTTRLSQPFIVHRPAHVAHDILVIPVGAGHD
LPPKVVVKSGTKVEFTPIDSSVNKAMVELGSYTAMAKCIVPPFSYHGFELDKVYSVDHGDY
YIAAGTHALCEQNLRLHIHVEHE

15/29

Figure 6

HtH2 cDNA sequence and intron structure

Domain b

CACAGACTGTTTCGTCACCCAGGTGGAAGATGCTCTGATCAGGCGAGGATCGCCTATAGGGG
TCCCCTACTGGGACTGGACTCAGCCTATGGCGCATCTCCCAGGACTTGCAGACAACGCCAC
CTATAGAGATCCCATCAGCGGGGACAGCAGACACAACCCCTTCCACGATGTTGAAGTTGCC
TTTGAAAATGGACGTACAGAACGTCACCCAGATAGTAGATTGTTTGAACAACCTTTATTTG
GCAACATACGCGTCTCTTCGACAGTATAGTCTATGCTTTTGAGCAGGAGGACTTCTGCGA
TTTTGAAGTTCAATTTGAGATGACCCATAATAATATTACGCCTGGATTGGTGGCGGCGAG
AAGTATTCCATGTCTTCTCTACACTACACAGCCTTCGACCCTATCTTCTACCTTCGTCACT
CCAACACTGACCGGCTCTGGGCAATTTGGCAAGCGTTGCAGATACGAAGAAACAGGCCTTA
CAAGGCTCATTGTGCTTGGTCTGAGGAACGCCAGCCTCTCAAACCTTTCGCCTTCAGTTCC
CCACTGAACAACAACGAAAAACCTACGAAAACCTCGGTGCCCACCAACGTTTACGACTACG
AAGGAGTCCTTGGCTATACTTATGATGACCTCAACTTCGGGGGCATGGACCTGGGTGAGCT
TGAGGAATACATCCAGAGGCAGAGACAGAGAGACAGGACCTTTGCTGGTTTCTTTCTGTCA
CATATTGGTACATCAGCGAATGTTGAAATCATTATAGACCATGGGACTCTTCATACCTCCG
TGGGCACGTTTGCTGTTCTTGGCGGAGAGAAGGAGATGAAATGGGGATTGACCGTTTGTA
CAAATATGAGATTACAGATGAACTGAGGCAACTTAATCTCCGTGCTGATGATGTTTTTCAGC
ATCTCTGTTAAAGTAACTGATGTTGATGGCAGTGAGCTGTCTCTGAACTCATCCCATCTG
CTGCTATCATCTTCGAACGAAGCCATA

Intron b/c

GTAAGTAGCTACCTGTTTATTCAATTTTTTCGCTTTGCCAATCAATTCATTTCAGCTTGAAA
TTCAATAATTGTGTTTTGTCATGGCTGAAAACCAATTTGAACTCTTTTCTTTTCTCAGGTG
AACTCAAATAAATAATCACTAATTGTTATGCACGCGGGTAGGGCATACTATATCCAC
ATCGGTCATCTCAAATGCAACAAATTGTCTTATTTCCGTTGGGACAAGCAAACCCCTT
TCCTGTAATCTTGCCTTTGGCATCCACTGGAATTAATGTTGACTGGTAATTGATACTGGCT
CTCTTCTTGCATAGAGTTAATATCTATAGTTTGTAAATCTTTATGATTTTGCTATTTATAT
TTCGACAGCATGCTATAGACACCCTAGACTATTGTATAGCCACTTGTATTGTTTTTCCATT
TATTATTTATAACAGAACATGGCTTGTAATTTTTATTTACCTTCCAG

Domain c

TTGACCATCAGGACCCGCATCATGACACAATCATTAGGAAAAATGTTGATAATCTTACACC
CGAGGAAATTAATFCTCTGAGGCGGGCAATGGCAGACCTTCAATCAGACAAAACCGCCGGT
GGATTCCAGCAAATTGCTGCTTTTTCACGGGGAACCCAAATGGTGCCCAAGTCCCGATGCTG
AGAAGAAGTTCTCCTGCTGTGTCCATGGAATGGCTGTCTTCCCTCACTGGCACAGACTCCT
GACCGTGCAAGGCGAGAATGCCCTGAGAAAGCATGGATGTCTCGGAGCTCTCCCCTACTGG
GACTGGACTCGGCCCTGTCTCACCTACCTGATTTGGTTTTTGGTAAGTAGCAGAACTACAC
CGATGCCATATTCCACCGTGGAAGCCCGAAACCCCTGGTACAGCGGCCATATTGATACAGT
TGGTGTGACACAACAAGAAGCGTCCGTCAAGAACTGTATGAAGCTCCTGGATTTGGCCAT
TATACTGGGGTCGCTAAGCAAGTGCTTCTGGCTTTGGAGCAGGATGACTTCTGTGATTTTG
AAGTCCAGTTTGAGATAGCTCACAATTTCAATTCACGCTCTTGTCGGCGGAAGCGAGCCATA
TGGTATGGCGTCACTCCGTTACACTACTTATGATCCAATTTTCTACCTCCATCATTCTAAC
ACTGACAGACTCTGGGCTATATGGCAGGCTCTACAAAAGTACAGGGGGCAAACCTTACAATT
CCGCCAACTGCGCCATTGCTTCTATGAGAAAACCCCTACAACCCTTTGGTCTGACTGATGA
GATCAACCCGGATGATGAGACAAGACAGCATGCTGTTCTTTTCAGTGTCTTTGATTACAAG
AACAACTTCAATTATGAATATGACACCCTTGACTTCAACGGACTATCAATCTCCCAGCTGG
ACCGTGAAGTGTACGGAGAAAGTCTCATGACAGAGTATTTGCCGGATTTTGTGCTGCATGG

REPLACEMENT SHEET NO. 16

16/29

TATTCAGCAGTCTGCACTAGTTAAATTCTTTGTCTGCAAATCAGATGATGACTGTGACCAC
TATGCTGGTGAATTCTACATCCTTGGTGATGAAGCTGAAATGCCATGGGGCTATGATCGTC
TTTACAAATATGAGATCACTGAGCAGCTCAATGCCCTGGATCTACACATCGGAGATAGATT
CTTCATCAGATACGAAGCGTTTGATCTTCATGGTACAAGTCTTGGAAGCAACATCTTCCCC
AAACCTTCTGTCTACATGACGAAGGGGCAG

Intron c/d

GTGAGAACATTGATAATAGTTCAAATgAAGTATATCCGATTCAAGCTGTCGATACAAGATg
AGATACATAATCACAATGTTTGTATTAGATATCTCTCTAATTTAATGCCGCTTTTATCAA
TATTCGAGCAATCCTTCAGCAACATACACCAGCAAATGTTTCATCAACAGACTATATTATT
TAATCTTTTAAAAATCCTTTTCTGTTGTTATAAATACTTAAAGTATCGAATTCCTTGAATG
CGTCTTCTCTGCAGCATATAGTTAAGTTGTTGTGTTTCTCTGTCTGTCAG

Domain d

GTCACCATCAGGCTGACGAGTACGACGAAGTTGTAAGTCTGCAAGCCACATCAGAAAGAA
TTTAAAAGATCTGTCAAAGGGAGAAGTAGAGAGCCTAAGGTCTGCCTTCCTGCAACTTCAG
AACGACGGAGTCTATGAGAATATTGCCAAGTTCCACGGCAAGCCTGGGTTGTGTGATGATA
ACGGTCGCAAGGTTGCCTGTTGTGTCCATGGAATGCCACCTTCCCCCAGTGGCACAGGCT
CTATGTCCTCCAGGTGGAGAATGCTTTGCTGGAGAGAGGATCTGCCGTCTCTGTGCCATAC
TGGGACTGGACTGAAACATTTACAGAGCTGCCATCTTTGATTGCTGAGGCTACCTATTTCA
ATTCCCGTCAACAAACGTTTGACCCTAATCCTTTCTTCAGAGGTAAAATCAGTTTTGAGAA
TGCTGTTACAACACGTGATCCCCAGCCTGAGCTGTACGTTAACAGGTACTACTACCAAAC
GTCATGTTGGTTTTTTGAACAGGACAACACTACTGCGACTTCGAGATACAGTTTTGAGATGGTTC
ACAATGTTCTCCATGCTTGGCTTGGTGGAAGAGCTACTTATTCTATTTCTTCTCTTGATTA
TTCTGCATTTCGACCCTGTGTTTTTTCCTTCACCATGCGAACACAGATAGATTGTGGGCCATC
TGGCAGGAGCTGCAGAGGTACAGGAAGAAGCCATACAATGAAGCGGATTGTGCCATTAACC
TAATGCGCAAACCTCTACATCCCTTCGACAACAGTGATCTCAATCATGATCCTGTAACCTT
TAAATACTCAAAACCCACTGATGGCTTTGACTACCAGAACAACCTTTGGATACAAGTATGAC
AACCTTGAGTTCAATCATTTTCAGTATTCCCAGGCTTGAAgAAATCATTTCGtATTAGACAAC
GTCAAGATCGTGTGTTTGCAGGATTCCCTCCTTCACAACATTGGGACATCCGCAACTGTTGA
GATATTCTGTCTGTGTCCCTACCACCGGTGAGCAAACCTGTGAAAACAAAGCCGGAACA
TTTGCCGTACTCGGAGGAGAAACAGAGATGGCGTTTCATTTTGACAGACTCTACAGGTTTG
ACATCAGTGAAACACTGAGGGACCTCGGCATACAGCTGGACAGCCATGACTTTGACCTCAG
CATCAAGATTCAAGGAGTAAATGGATCCTACCTTGATCCACACATCCTGCCAGAGCCATCC
TTGATTTTTGTGCCTGGTTCAAGT

Intron d/e

AAGAAAGTTTCACTGTCTAAATCTTTTTTTTATGATAGAGGGTAGAGAAGTGGAGACAATGT
GACAATATATTGAATAAAGTTGTTTAAAATTTATAACTCTCATAAGTTCATATTATGCTGA
AGCTGTAGCCATCTATAACTGTGTAACATGAAATGTTAAGACATTAACCTAAATACTTCAG
CTGATAACAAAACAATGTTAATACATACGTCAATGTAACATTTTCTTATCTTTAGGTTATA
GCATAAACACTTCAGAGATACAGTGACGAAAACCTCTATTTAAATATTTTCAGGT

Domain e

TCTTTCCTGCGTCTGATGGGCATTTCAGATGACATCCTTGTGAGAAAAGAAGTGAACAGCC
TGACAACCAAGGGAGACTGCATCTCTGATCCATGCTCTGAAAAGTATGCAGGAAGACCATTC
ACCTGACGGGTTCCAAGCCATTGCCTCTTTCCATGCTCTGCCACCACTCTGCCCTTCACCA
TCTGCAGCTCACCGTTATGCTTGTGTTGTCACGGCATGGCTACATTTCCCCAGTGGCACA
GATTGTACACTGTACAGTTCCAGGATGCACTGAGGAGACATGGAGCTACGGTAGGTGTACC
GTATTGGGATTGGCTGCGACCGCAGTCTCACCTACCAGAGCTTGTCAACCATGGAGACATAC

17/29

CATGATATTTGGAGTAACAGAGATTTCCCAATCCTTTCTACCAAGCCAATATTGAGTTTG
AAGGAGAAAACATTACAACAGAGAGAGAAGTCATTGCAGACAACTTTTTGTCAAAGGTGG
ACACGTTTTTTGATAAACTGGTTCTTCAAACAAGCCATCCTAGCGCTGAGCAGGAAAACACTAC
TGTGACTTTGAGATTTCAGTTTGAAATTTCTTACAACGGCGTTCACACGTGGGTTCGGAGGCA
GTCGTACCTACTCTATCGGACATCTTCATTACGCATTCTACGACCTCTTTTCTACCTTCA
CCATTTCCAGACAGACCGTATTTGgGCAATCTGGCAAGAACTCCAGGAACAGAGAGGGCTC
TCGGGTGATGAGGCTCACTGTGCTCTCGAGCAAATGAGAGAACCATTGAAGCCTTTCAGCT
TCGGCGCTCCTTATAACTGGAATCAGCTCACACAGGATTTCTCCCGACCCGAGGACACCTT
CGACTACAGGAAGTTTGGTTATGAATATGACAATTTAGAATTCCTGGGAATGTCAGTTGCT
GAACTGGATCAATACATTATTGAACATCAAGAAATGATAGAGTATTCGCTGGGTTCCTGT
TGAGTGGATTTCGGAGGTTCCGCATCAGTTAATTTCCAGGTTTGTAGAGCTGATTCCACATG
TCAGGATGCTGGGTACTTCACCGTTCTTGGTGGCAGTGCTGAGATGGCGTGGGCATTTGAC
AGGCTTTTACAAATATGACATTACTGAACTCTGGAGAAATGCACCTTCGATATGATGATG
ACTTCACAATCTCTGTGAGTCTGACCGCCAACAACGGAAGTGTCTTGAGCAGCAGTCTAAT
CCCAACACCGAGTGTTCATATTCAGCGGGGACATC

Intron e/f

AAGTAGTAAACTGCTCAGATTGTTTTTCATAATTACTCCACTATTAAGTAAAAAGTACTAGT
AATTCAATAGTACTGTTTACAGAGAAATGTAAACACAATAGACCACAGAGTCCATTTGTAA
ACGCCTTTGGCTTGGTAAAGTCTGAGGTTTTGGTGACTGATGGAAAGCTAAAATATATTTTG
ACAG

Domain f(1)

GTGACATAAATACCAGGAGCATGTCACCGAACCCTGTTTCGCCGTGAGCTGAGCGATCTGTC
TGCGAGGGACCTGTCTAGTCTCAAGTCTGCTCTGCGAGACCTACAGGAGGATGATGGCCCC
AACGGATACCAGGCTCTTGCAGCCTTCCATGGGCTACCAGCAGGCTGCCATGATAGCCGGG
GAAATGAGAT

Intron f

ATATTTAAAGTATTTTATCTTACGCATGACCCTGACCCTATTATTTTTTTAATCCTATGAT
GAAACATTTACTTAGACTGGCTTGTGAGCCCCAGGCAAAATGCACTGTAAAAATACACTGA
CAGAGGATTAGGCATTCTTGGGAGTACTGTATAGTTAGTTGCATACATATTAGCGTTCCT
CACTAAAACGAATCTCTGAATGCTATCAATTAAAGATCATGATGCTTTGATTGTGTCTACT
GTATTTAAATGGTGTAAAGATTTGCAATTACAATATACACAAACACGTTTCCTGCATCTC
GGAGAATGCAATCTTTCGTTGTACGCGTCTGTTTTTCATATTTTTATGCATGTAGTTTGCAC
TACTTAGCGTCCAATAAATCCATTACAAAATCACACAAACAAACGATTTTAGGAATGTGA
CTGTAGCTGCAACGAATATACCTGATCCTTTCTTGTTCAGAT

Domain f(2)

CGCATGTTGCATTACAGGGATGCCGACCTTCCCCAGTGGCACAGACTGTACACCCTGCAG
TTGGAGATGGCTCTGAGGAGACATGGATCATCTGTGCCATCCCCTACTGGGACTGGACAA
AGCCTATCTCCGAACCTCCCTCGCTCTTACCAGCCCTGAGTATTATGACCCATGGCATGA
TGCTGTGGTAAACAACCCATTCTCCAAAGGTTTTGTCAAATTTGCAAATACCTACACAGTA
AGAGACCCACAGGAGATGCTGTTCCAGCTTTGTGAACATGGAGAGTCAATCCTCTATGAGC
AACTCTTCTTGCTCTTGAGCAAACCGACTACTGTGATTTTGAGGTACAGTTTGAGGTCCT
CCATAACGTGATCCACTACCTTGTGGTGGACGTCAGACCTACGCATTGTCTTCTCTGCAT
TATGCCTCCTACGACCCATTCTTCTTTATACACCATTCTTTTGTGGATAAGATGTGGGTAG
TATGGCAAGCTCTTCAAAGAGGAGGAACTTCCATACAAGCGAGCTGACTGTgcTGTCAA
CCTAATGACTAAACCAATGAGGCCATTTGACTCCGATATGAATCAGAACCCATTTCACAAAG
ATGCACGCAGTTCCCAACACACTCTATGACTACGAGACACTGTACTACAGCTACGATAATC
TCGAAATAGGTGGCAGGAATCTCGACCAGCTTCAGGCTGAAATTGACAGAAGCAGAAGCCA

REPLACEMENT SHEET NO. 18

18/29

CGATCGCGTTTTTCTGGATTCTTGCTTCGTGGAATCGGAACTTCTGCTGATGTCAGGTTT
TGGATTTGTAGAAATGAAAATGACTGCCACAGGGGTGGAATAATTTTCATCTTAGGTGGAG
CCAAGGAAATGCCATGGTCATTTGACAGAACTTCAAGTTTGATATCACCCATGTACTCGA
GAATGCTGGCATTAGCCCAGAGGACGTGTTTGATGCTGAGGAGCCATTTTATATCAAGGTT
GAGATCCATGCTGTAAACAAGACCATGATACCGTCGTCTGTGATCCCAGCCCCAACTATCA
TCTATTCTCCTGGGGGAAAG

Intron f/g

GTGAGAGAACCAGTAATAGCTACTGTCTACAAAGAATGTGTTTCATTTAAAGACCTGACTGT
AGGCCGATGGCTGCTGTCATCTCCTCCGCCTCCTCCTCCTGTTCTCCTCCGAAGGGGTCA
GTTTCAGGTTCTCTTGCCAATATGCCAAGCAGACCTCCTGAGCAGGCAGTATATATACGTA
AGGGAAGCAAGTATGGACCATCGCGCGGCATGTAGAGATACAATGATCAGCTGTCTGCTGT
TCCACTCCTGTCAGACAATGAGATAAACATGAATACAGTATTACTCAGCAGCGTTCCAATT
TTCAACCCTCGTATTTATTAAGGAATTTTAAATATATTTTCTCCTTGTGAAATA
TTTTAGTAAGTATTAATCGATATAGAGTGGAGTAGTGACGCTTTATTTTCGGTTCATTCTCG
AAACAAAAATATAATAGTCCACTGAACTCTCTTAAATTGTTTTTACAACCTTCAACTGCCA
CAGACGTAATCCCTCACGTTATTTTGAGCTGACAACGTGTTGAATTGAGTGTGTTCCGAAT
TCTAAATAAGCATGTATATATTTACGTCTCATGCAAGTAATATATGTTTAACTGATGACGT
CACTTGGTGACCACTGATTTAGTTTCTTTGTCATAATTGCAGTTTCTGTTGTCACGGGGAC
GGTGGGGAAGCCAGGTTCTCCTGTCACGCTGAATATCCCGTTTCAATCCCCACATGGGT
ACAAAGTGTGATGCCTATTTCTGGTGTCCCCACCCTGATATTGCTGGAATAAGTGGCTTA
ATACCATATACACTCACTCTATTGTCACACTACTGCCACCGGCTCACACCTCTGATGCTTC
TGTTCTATCCAG

Domain g(1)

GTCGCGCTGCTGACAGTGCGCACTCTGCCAACATTGCTGGCTCTGGGGTGAGGAAGGACGT
CACGACCCTCACTGTGTCTGAGACCGAGAACCTAAGACAGGCTCTTCAAGGTGTCATCGAT
GATACTGGTCCCAATGGTTACCAAGCAATAGCATCCTTCCACGGAAGTCCTCCAATGTGCG
AGATGAACGGCCGCAAGGTTGCCTGTTGTGCTCAG

Intron g(1)

GTAATTAATGGATGTGAAGTCAATGTCCGAGGGTATAATAAGGATTTAAATACTTCAGTCG
TGTAATACTGTATGACATGTGTATTGGATGGTGTAGGTATTACAGGTTATAAGGCCAGTGT
GTGTTGGGACGGTTACTTTCTGCACTAGTAATAAGCATTGTATTTAGCTAGCTTTTATCA
TATAACTTTAGTTTCAGGTTTGTGGCAATTGAAATCGAAATTTTCTTTTCAATTTCAAGGTTA
TCGCACTCGTGTGTNAGAATAGTTACTATGCTGCATTGAGAATAACACTATAGTAATAAAG
CATATCATAACAGTAAGAATAACACTATAGTAATAAAGTATATCATNCAGTAAGAATGTCAT
TGTATGATAAATAGGTTATCACACTCGTGTGTTTTAGAATGGTTACTATCCCAGGAATAAC
CACTATGTATTACATGTATATTGGGCAGTGTAAGTAGTAGCATTGTATATTAAATCAGTAT
ATCGTGCTTCAAAACACCAGGATATATGGGGTATACAGTGGGCAGTGTAAAGTAGCAACATT
GTATATTAAATCAGTATATCGTACTTCAAAACACCAGGATTATGGGGTATACAGTGGGCAG
TGTAAGTAGTAGCATTGTATATTAAATCAGTATATCGTACTTCAAAACACCAGGATATAAT
TCAGTATATCGTGCTTCAAAACACCAGGATATAATTCAGTATATCGTGCTTCAAAACACCA
GGATATATGGGATATACAGTGCGGGTTTGCATACAACCTCCACCTTTACAG

Domain g(2)

GTATGGcCTCCTTCCcACACTGGCACAGACTGTATGTGAAGCAGATGGAAGATGCCCTGGC
TGACCACGGGTACATATCGGCATCCCTTACTGGGACTGGACAACCTGCCTTCACAGAGTTA
CCCGCCCTTGTACAGACTCCGAGAACAATCCCTTCCATGAG

REPLACEMENT SHEET NO. 19

19/29

Intron g(2)

GTCAGTTTAGTCTCCTGTCTGAGCTAACGATACCAATTTCTATTTTCGAGAACCACGATG
ACGAGAAAACAAGCAATATAGATATAGATGCAGTATAGATCAAGTTAATGAATTCATTGCT
ATATGTTTGCTTGTAATAAACTTTAAGAAAACGAGAGCATGCACACAAATGAAACAAACAA
TTATGTGTTTGATAGGAATATGATATATGTATTTGGGGGCTGACGTGAGCAGGGTTGAAGG
GACAGTTTACATTGTGAGTAACACTGGGAGTATTCTTTGATCCACAATATATAGTTTTCATT
GTGTTTCAGCAGTTACAACCTAACATTATATCATACATTACGTCGTAACATGCTTCTTTTGTC
CTCTTTTGCCAG

Domain g(3)

GGTCGCATTGATCATCTCGGTGTAACCACGTCACGTTCCCCCAGAGACATGCTGTTTAACG
ACCCAGAGCAAGGATCAGAGTCGTTCTTCTATAGACAAGTCCTCCTGGCTTTGGAGCAGAC
TGACTACTGCCAGTTTGAAGTCCAGTTTGAGCTGACCCACAACGCCATTCACTCCTGGACA
GGTGGACGTAGCCCTTACGGAATGTCGACCTCGAGTTTACAGCCTACGATCCTCTCTTCT
GGCTTCACCACTCCAACACCGACAGAATCTGGGCTGTCTGGCAAGCACTGCAGAAATACCG
AGGACTCCCATAACAAGCAAGCACACTGTGAAATCCAGGTTCTGAAACAGCCCTTGAGGCCA
TTCAACGATGACATCAACCACAATCCAATCACCAAGACTAATGCCAGGCCTATCGATTTCAT
TTGATTATGAGAGGTTTAACTATCAGTATGACACCCTTAGCTTCCATGGTAAGAGCATCCC
TGAAGTGAATGACCTGCTCGAGGAAGAGAAAAAGAGAGAGAACATTTGCTGCTTCCTT
CTTCGTGGAATCGGTTGCAGTGCTGATGTCGTCTTTGACATCTGCCGCCCCAATGGTGACT
GTGTCTTTGCAGGAACCTTTGCTGTGCTGGGAGGGGAGCTAGAAATGCCTTGGTCTTCGA
CAGACTGTTCCGCTATGACATCACCAGAGTCATGAATCAGCTCCATCTCCAGTATGATTCA
GATTTTCAGTTTCAGGGTGAAGCTTGTGTCACCAATGGCACTGAGCTTTCATCAGACCTTC
TCAAGTCACCAACAATTGAACATGAACTTGG

Intron g/h

GTATGTTATCTTATCATCAAATGTGTGATCAGATACTGGAGACGTTTTTCATATTAACCTGG
TCAGCATTAGTTGATGATTTTGGTGCGATGTTGACGACAAGGAGTCAAGCATTAAACACATT
CAACACATCTTTAATCTGATATGAGAAGGGAATAAATTGATCCAGTATTGATGATTGAAGT
TAGATTAACAGTGAAAGATATACCAGTTTTGATAATCGTATAAAACAGTAGCAGAATTGTA
TCGTGAAACTAAATGTGGGAAGGCCAAGCCAAAGCAGATTTTAGATTACGATCGTGTGCT
AGAATAATTACAAATAACCCAGACGTCGGAAATGTGGTTGTCTATGGCAATGGTTACGATT
AATTGCTAACATGCACGATTTACCTATTTTACG

Domain h

AGCCACAGAGGACCAGTTGAAGAAACAGAAGTCACTCGCCAACATACTGACGGCAATGCA
CACTTTTCATCGTAAGGAAGTTGATTTCGCTGTCCCTGGATGAAGCAAACAACCTTGAAGAATG
CCCTTTACAAGCTACAGAACGACCACAGTCTAACGGGATACGAAGCAATCTCTGGTTACCA
TGGATACCCCAATCTGTGTCCGGAAGAAGGCGATGACAAAATACCCCTGCTGCGTCCCCGG
ATGGGCATCTTTCTTACTGGCACAGACTCTTGACCATTCAACTGGAAAGAGCTCTTGAGC
ACAATGGTGCCTGCTTGGTGTTCCTTACTGGGACTGGAACAAGGACCTGTCGTCACTGCC
GGCGTTCTTCTCCGACTCCAGCAACAACAATCCCTACTTCAAGTACCACATCGCCGGTGT
GGTCACGACACCGTCAGAGAGCCAACTAGTCTTATATATAACCAGCCCCAAATCCATGGTT
ATGATTATCTCTATTACCTAGCATTGACCACGCTTGAAGAAAACAATTACTGGGACTTTGA
GGTTCAGTATGAGATCCTCCACAACGCCGTCCACTCCTGGCTTGGAGGATCCCAGAAGTAT
TCCATGTCTACCCTGGAGTATTCGGCCTTTGACCCTGTCTTTATGATCCTTCACTCGGGTC
TAGACAGACTTTGGATCATCTGGCAAGAACTTCAGAAGATCAGGAGAAAGCCCTACAACCT
CGCTAAATGTGCTTATCATATGATGGAAGAGCCACTGGCGCCCTTCAGCTATCCATCTATC
AACCAGGACGAGTTCACCCGTGCCAACTCCAAGCCTTCTACAGTTTTTGACAGCCATAAGT

REPLACEMENT SHEET NO. 20

20/29

TCGGCTACCATTACGATAACCTGAATGTTAGAGGTCACAGCATCCAAGAACTCAACACAAT
CATCAATGACTTGAGAAACACAGACAGAATCTACGCAGGATTTGTTTTGTCAGGCATCGGT
ACGTCTGCTAGTGTCAAGATCTATCTCCGAACAGATGACAATGACGAAGAAGTTGGAACCT
TCACTGTCCTGGGAGGAGAGAGGGGAAATGCCATGGGCCTACGAGCGAGTTTTCAAGTATGA
CATCACAGAGGTTGCAGATAGACTTAAAATTAAGTTATGGGGACACCCTTTAACTTCCGGA
ACTGGAGATCACATCCTTACGAATGGAATCGGTGGTAAACAAGAGCCTACCCAAATCCTTT
CATCATCTACAGACCTGCCAATCATGACTACGATGTTCTTGTTATCCCAAGTANGGAAGAAA
CCTTCACATCCCTCCCAAAGTTGTCGTCAAGAAAGGCACCCGCATCGAGTTCCACCCAGTC
GATGATTCAGTTACGAGACCAGTTGTTGATCTTGGAAGCTACACTGCACTCTTCAACTGTG
TGGTACCACCGTTCACATACCACGGATTGCAACTGAACCACGTCTATTCTGTCAAGCCTGG
TGAATACTATGTTACTGGACCCACGAGAGACCTTTGCCAGAATGCAGATGTCAGGATTCAT
ATCCATGTTGAGGATGAGTAA

3' UTR

CGCAACAGGT

Intron UTR

GAGATAAGAAACCCTTCTAACAGTAATACGACACCACATTACAGCTTAAACATGATTGCCA
TCGATGTTTTTCATGTGTAGTATACGCTTTTCAGTTCTACATAATTTTGTTTTTCAAATCAA
GTTTAGCAAATGAATCTATCACTGGAAAATAGGGTAGGGTAGCCAAGTGGTTAAAGCGGTC
ACTGATCACGCCAAAGACGAGTGTCTAACCTGCATGGGTACAAAAGTGAAGACCATTGCT
GGTGTCTACCGCCGTAATATTGTTTTTAGTATTGCTAAAACTTATACTCACCCATGCGCTG
TAAAAGTGAATAATAATCATATTTCAACAAAAGCACAAAACCATTTTCATTTTCATGAAAG
CCTCTTGTTTCACCTGAAAGACGCAAGAGAACAAATAGTTCCCTAACATTATTTTCAGACATTG
GAAATGTCCTGCACGTGTAAACCATATATCCTTTGAAATTTTACGACTGCATCGTATACA
ATTTATGATATAAATTTAAAACTTTAT

3' UTR

TTCTTGGTCTCCACATATTCACATATCAGCACCAAATGGTTTCGAAGGACATTGGCGTTCT
TCTCTGGCAATGCATTTCAATACAACATTGAAAATGACTTCAGCATATCAGTGTGCTTCGA
ACGTGTTCCGGAAGTACTCAAATGTGCTATGACTGAATTATTGTACATACATAACTTATTG
ATGTTCAATAAATAAATGTTGAAACGAAAAAAAAAAAAAAAAAAAAA

21/29

Figure 7

Derived primary structure of Hth2

Domain b

HRLFVTQVEDALIRRGSPIGVPYWDWTQPM AHL PGLADNATYRDPI SGDSRHNPFDHVEVA
FENGRTERHPDSRLFEQPLFGKHTRLFDSIVYAFEQEDFCDFEVQFEMTHNNIHAWIGGGE
KYSMSSLHYTAFDPIFYLRHSNTDRLWAIWQALQIRNRNPYKAHCAWSEERQPLKPFASFSS
PLNNNEKTYENSVPTNVYDYEGVLGYTYDDLNF GGMDLGQLEEYIQRQRQDRTFAGFFLS
HIGTSANVEIIIDHGT LHTSVGTF AVLGG EKEMKWGFDRLYKYEITDEL RQLNLRADDVFS
ISVKVTDVDGSELSSSELIPSAIIIFERSH

Domain c

IDHQDPHHD TIIRKNVDNLTPEEINSLRRAMADLQSDKTAGGFQQIAAFHGEPKWCPSPDA
EKKFSCCVHGMVFPWHRLTLVQGENALRKHGCLGALPYWDWTRPLSHLPDLVLVSSRTT
PMPYSTVEARNPWYSGHIDTVGVDTTRS VRQELYEAPGFGHYTGVAQVLLALEQDDFCDF
EVQFEIAHNFIHALVGGSEPYGMASLRYTTYDPIFYLRHSNTDRLWAIWQALQKYRGKPYN
SANCAIASMRKPLQPFGLTDEINPDDETRQH AVPF SVFDYKNNFN YEYDTLDFNGLSISQL
DRELSRRKSHDRVFAGFLLHGIQQSALVKFFVCKSDDDCDHYAGEFYILGDEAEMPWGYDR
LYKYEITEQLNALDLHIGDRFFIRYEA FDLHGTS LGSNIFPKPSVIHDEGA

Domain d

GHHQADEYDEVVTAASHIRKNLKDLSKGEVESLRS AFLQLQNDGVYENIAKFHGKPGLCDD
NGRKVACCVHGMPTFPQWHRLYVLQVENALLERGS AVSVPYWDWTETFTELPSLIAEATYF
NSRQOTFDPNPF FRGKISFENAVTTRDPQPELYVNRYYYQNVMLVFEQDNYCDFEIQFEMV
HNVLHAWLGGRATYSSISLDYSAFDPVFFLHHANTDRLWAIWQELQRYRKKPYNEADCAIN
LMRKPLHPFDNSDLNHDPTVTFKYSKPTDGFQYNNFGYKYDNLEFNHFSIPRLEETIRIRO
RQDRVFAGFLLHNIGTSATVEIFVCVPTTSGEQNCENKAGTFAVLGGETEMAFHFDRLYRF
DISETLRDLGIQLDSHDFDLSIKIQGVNGSYLDPHILPEPSLIFVPGSS

Domain e

SFLRPDGHSSDDILVRKEVNSLTRETASLIHALKSMQEDHSPDGFQAIASFHALPPLCPSP
SAAHRYACCVHGMATFPQWHRLYTVQFQDALRRHGATVGVPYWDWLRPQSHLP ELVTMETY
HDIWSNRDFPNPFYQANIEFEGENIT TEREVIADKLFVKGGHVFDKLVLOTSHPSAEQENY
CDFEIQFEILHNGVHTWVGGSRTYSIGHLHYAFYDPLFYLRHHFQTDRIWAIWQELQEORGL
SGDEAHCALEQMREPLKPFSGAPYNWNQLTQDFSRPEDTFDYRKFGYEYDNLEFLGMSVA
ELDQYIIHQENDRVFAGFLLSGFGGSASVNFQVCRADSTCQDAGYFTVLGGS AEMAWAFD
RLYKYDITETLEKMHLRYDDDF TISVSLTANNGTVLSSSLIPTPSVIFQRGH

Domain f

RDINTRSMSPNVRRELSDLSARDLSSLKSALRDLQEDDGPNGYQALAAFHGLPAGCHDSR
GNEIACCIHGMP TFPQWHRLYTLQLEMALRRHGSSVAIPYWDWTKPISELPSLFTSPEYYD
PWHDAVVNNPFSKGFVKFANTYTVRDPQEMFLFQLCEHGESI LYEQTLLALEQTDYCDFEVQ
FEVLHNVIHYLVGG RQTYALSSSLHYASYDPFFFIHHSFVDKMWVWQALQKRRKLPYKRAD
CAVNLMTKPMRPFDS DMNQNPFTKMHAVPNTLYDYETLYSYDNLEIGGRNLDQLQAEIDR

REPLACEMENT SHEET NO. 22

22/29

SRSHDRVFAGFLLRGIGTSADVRFWICRNENDCHRGIIIFILGGAKEMPWSFDRNFKFDIT
HVLENAGISPEDVFDAEPPFYIKVEIHAVNKTMI PSSVIPAPTIIYSPGE

Domain g

GRAADSAHSANIAGSGVRKDVTTTLTVSETENLRQALQGVIDDTGPNGYQAIASFHGSPPMC
EMNGRKVACCAHGMA SFPHWHRLYVKQMEDALADHGSHIGIPYWDWTTAFTELPALVTDSE
NNPFHEGRIDHLGVTTSSRS PRDMLFNDPEQGSSEFFYRQVLLALEQTDYCOFEVQFELTHN
AIHSWTGGRSPYGMSTLEFTAYDPLFWLHHSNTDRIWAVWQALQKYRGLPYNEAHCEIQVL
KQPLRPFND D INHNPI TKTNARPIDSFDYERFNYQYDTLSFHGKSIPELNDLLEERKREER
TFAAFLLRGIGCSADVVF DICRPN GDCVFAGTFAVLGGELEMPWSFDRLFRYDITRVMNQL
HLQYDSDFSFRVKLVATNGTELSSDLLKSPTIEHEL

Domain h

GAHRGPVEETEVTROHTDGN AHFHRKEVDSL SLDEAN NLKNALYKLQNDHSLTG YE AISGY
HGYPNLCPEEGDDKI PLLRPRMGIFPYWHRLTIQLERALEHNGALLGVPYWDWNKDLSSL
PAFFSDSSNNNPYFKYHIAGVGHD TVREPTSLIYNQPQIHGYDYLYYLALTTLEENNYWDF
EVQYEILHNAVH SWLGGSQKYS MSTLEYS AFDPVFMILHSGLDRLWIIWQELQKIRRKPIN
FAK CAYHMMEEPLAPFSYPSINQDEFTRANSKPSTVFD SHKFGYHYDNLNVRGHSIQELNT
IINDLRNTDRIYAGFVLSGIGTSASVKIYLRTDDNDEEVGTFTVLGGEREMPWAYERVFKY
DITEVADRLKIKLWGHPLTSGTGDHILTNGIGGKQEP TQILSSSTDLPIMTTMFLLSQXGR
NLHI PPKV VVKGTRIEFHPVDDSVTRPVVDLGSYTALENCVVP PFTYHGFELNHVYSVKP
GDYYVTGPTRDLCQ NADVRIHIHVEDE

23/29

Figure 8

KLH1 cDNA sequence and intron structure

Domain b

GGCCTACCGTACTGGGACTGGACTGAACCCATGACACACATTCCGGGTCTGGCAGGAAACA
AAACTTATGTGGATTCTCATGGTGCATCCACACAAATCCTTTTCATAGTTCAGTGATTGC
ATTTGAAGAAAATGCTCCCCACACCAAAGACAAATAGATCAAAGACTCTTTAAACCCGCT
ACCTTTGGACACCACACAGACCTGTTCAACCAGATTTTGTATGCCTTTGAACAAGAAGATT
ACTGTGACTTTGAAGTCCAATTTGAGATTACCCATAACACGATTTCACGCTTGGACAGGAGG
AAGCGAACATTTCTCAATGTCGTCCCTACATTACACAGCTTTCGATCCTTTGTTTTACTTT
CACCATTCTAACGTTGATCGTCTTTGGGCCGTTTGGCAAGCCTTACAGATGAGACGGCATA
AACCCTACAGGGCCCACTGCGCCATATCTCTGGAACATATGCATCTGAAACCATTTCGCTT
TTCATCTCCCCTTAACAATAACGAAAAGACTCATGCCAATGCCATGCCAAAACAAGATCTAC
GACTATGAAAATGTCCTCCATTACACATACGAAGATTTAACATTTGGAGGCATCTCTCTGG
AAAACATAGAAAAGATGATCCACGAAAACCAGCAAGAAGACAGAATATATGCCGGTTTTCT
CCTGGCTGGCATACTACTTCAGCAAATGTTGATATCTTCATTAAAACTACCGATTCCGTG
CAACATAAGGCTGGAACATTTGCAGTGCTCGGTGGAAGCAAGGAAATGAAGTGGGGATTTG
ATCGCGTTTTTCAAGTTTGACATCACGCACGTTTTTGAAAGATCTCGATCTCACTGCTGATGG
CGATTTCGAAGTTACTGTTGACATCACTGAAGTCGATGGAACATAAATTGCATCCAGTCTT
ATTCCACATGCTTCTGTTCATTTCGTGAGCATGCACGTGGTAAGCTGAATAGAG

Intron b/c

GTTTTGTAATAATTATGTAGAATTCTTTACCTCAGAATAAGATGAGGTCACATGGGTTTTG
CAAACTATTACGTTCGAATTAATATTAATAATACCGGACCCTCCACTGGTACATATTTAT
CTTTATAACGATAATAGCGATGATGATGATGATGATGATGATGATGATGATGATGATgATAATg
ATgATGCCGGTATTGCACGTAATCCAGCCGAcTTAGATGACACCCTAAGGGTGCAGAAAGT
ATAaCAATTAGATTGCGTTtGCATCTGTGTATGCGTGTGCTTTAaCCAAAAGTCAAAATAA
AAGTGCAAACCCTTAGTTTATTTCATTTGATAGAGCCTTTTACGATAAGAACAATGTAATAA
ATTAGAACATAACTGAAACCTCCGAAAGAAGGCCTGTTTGTCAAGAGAGGTATCGACATGA
TTGACTTATAAACCTGTGCTTCTATATTTTGGAACTGTCCACTTTCTTGTTGTGTGTACTG
TAATCACATCGCACTATGGCTGCAAGACGTGTACGAGTACACTATATACTTACCTAATGAC
CAACCACAAGGCTGGCTTTGTTAATATTGTTATTTACAGAAATAAACACAGAATTCCAGC
ATTTGGCTGGTGTATTTAGCAAAACACCGATATGACACTCATGTTTTATTACATTTTTTTC
AG

Domain c

TTAAATTTGACAAAGTGCCAAGGAGTCGTCTTATTGCAAAAAATGTAGACCGTTTGAGCCC
CGAGGAGATGAATGAACTTCGTAAAGCCCTAGCCTTACTGAAAGAGGACAAAAGTGCCGGT
GGATTTTCAGCAGCTTGGTGCATTCCATGGGGAGCCAAAATGGTGTCTTAGTCCCGAAGCAT
CTAAAAAATTTGCCTGCTGTGTTTACGGCATGTCTGTGTTCCCTCACTGGCATCGACTGTT
GACGGTTCAGAGTGAAAATGCTTTGAGACGACATGGCTACGATGGAGCTTTGCCGTACTGG
GATTGGACCTCTCCTCTTAATCACCTTCCCGAACTGGCAGATCATGAGAAGTACGTCGACC
CTGAAGATGGGGTAGAGAAGCATAACCCTTGGTTCGATGGTCATATAGATACAGTCGACAA
AACAACAACAAGAAGTGTTCAGAATAAACTCTTCGAACAGCCTGAGTTTGGTCATTATACA
AGCATTGCCAAACAAGTACTGCTAGCGTTGGAACAGGACAATTTCTGTGACTTTGAAATCC
AATATGAGATTGCCATAACTACATCCATGCACTTGTAGGAGGCGCTCAGCCTTATGGTAT
GGCATCGCTTCGCTACACTGCTTTTGATCCACTATTCTACTTGCATCACTCTAATACAGAT
CGTATATGGGCAATATGGCAGGCTTTACAGAAGTACAGAGGAAAACCGTACAACGTTGCTA
ACTGTGCTGTTACATCGATGAGAGAACCTTTGCAACCATTTGGCCTCTCTGCCAATATCAA
CACAGACCATGTAACCAAGGAGCATTTCAGTGCCATTCAACGTTTTTGATTACAAGACCAAT

REPLACEMENT SHEET NO. 24

24/29

TTCAATTATGAATATGACACTTTGGAATTTAACGGTCTCTCAATCTCTCAGTTGAATAAAA
AGCTCGAAGCGATAAAGAGCCAAGACAGGTTCTTTGCAGGCTTCCTGTTATCTGGTTTCAA
GAAATCATCTCTTGTTAAATTCAATATTTGCACCGATAGCAGCAACTGTCACCCCGCTGGA
GAGTTTTACCTTCTGGGTGATGAAAACGAGATGCCATGGGCATACGATAGAGTCTTCAAAT
ATGACATAACCGAAAACTCCACGATCTAAAGCTGCATGCAGAAGACCACTTCTACATTGA
CTATGAAGTATTTGACCTTAAACCAGCAAGCCTGGGAAAAGATTTGTTCAAGCAGCCTTCA
GTCATTTCATGAACCAAGAATAG

Intron c/d

GTACTTGTTATATGTTTCGAATATTGCCGATACCTTCAATATATATACTTTATCAAAGTAA
TTGATTAATCTGAAGTAATTTTCCTTTCCAGTAGAGATTCAGTTGATACAACAAGAATTG
CCCTGTTGTATGTCACCTTTATTTTCATCAAACGATTTCGAAGTGAGCTGTCCATGCCACAAT
GGGGTCTCTGTAACCTTTCTCGTATGGGGTATAGATTATATAGACGTGGCAGACCTTACGTA
TAACTAATATTTGTGTAATGTCGTTTCAG

Domain d

GTCACCATGAAGGCGAAGTATATCAAGCTGAAGTAACTTCTGCCAACCGTATTTCGAAAAAA
CATTGAAAATCTGAGCCTTGGTGAACCTCGAAAGTCTGAGAGCTGCCTTCCTGGAAATTGAA
AACGATGGAACCTTACGAATCAATAGCTAAATTCCATGGTAGCCCTGGTTTGTGCCAGTTAA
ATGGTAACCCCATCTCTTGTTGTGTCCATGGCATGCCAACTTTCCCTCACTGGCACAGACT
GTACGTGGTTGTCTGTTGAGAATGCCCTCCTGAAAAAAGGATCATCTGTAGCTGTTCCCTAT
TGGGACTGGACAAAACGAATCGAACATTTACCTCACCTGATTTTCAGACGCCACTTACTACA
ATTCCAGGCAACATCACTATGAGACAAACCCATTCCATCATGGCAAAATCACACACGAGAA
TGAAATCACTACTAGGGATCCCAAGGACAGCCTCTTCCATTTCAGACTACTTTTACGAGCAG
GTCCTTTACGCCTTGGAGCAGGATAACTTCTGTGATTTTCGAGATTCAGTTGGAGATATTAC
ACAATGCATTGCATTCTTTACTTGGTGGCAAAGGTAAATATTCCATGTCAAACCTTGATTA
CGCTGCTTTTGTATCCTGTGTTCTTCCTTCATCACGCAACGACTGACAGAATCTGGGCAATC
TGGCAAGACCTTCAGAGGTTCCGAAAACGGCCATACCGAGAAGCGAATTGCGCTATCCAAT
TGATGCACACGCCACTCCAGCCGTTTGATAAGAGCGACAACAATGACGAGGCAACGAAAAC
GCATGCCACTCCACATGATGGTTTTGAATATCAAAACAGCTTTGGTTATGCTTACGATAAT
CTGGAAGTGAATCACTACTCGATTCCCTCAGCTTGATCACATGCTGCAAGAAAGAAAAAGGC
ATGACAGATATTTCGCTGGCTTCCTCCTCACAAATATTGGAACatCTGCCGATGGCCATGT
ATTTGTATGTCTCCCAACTGGGGAACACACGAAGGACTGCAGTCATGAGGCTGGTATGTTT
TCCATCTTAGGCGGTCAAACGGAGATGTCCTTTGTATTTGACAGACTTTACAAACTTGACA
TAACTAAAGCCTTGAAAAAGAACGGTGTGCACCTGCAAGGGGATTTTCGATCTGGAAATTGA
GATTACGGCTGTGAATGGATCTCATCTAGACAGTCATGTCATCCACTCTCCCACTATACTG
TTTGAGGCGCGAACAG

Intron d/e

GTAACATTTTTGTCACTGTAACCAACAACCTGCAGTCTATTTTGCAATTACGATAATAACAA
TTTTTGAAATATATCTTTATTAAAGCAAAGGTTTCTAGAGACAAACAGCCGGCTCTAATTA
TTTTTTTCGAACTTACGCTTGAGTAAAGATCTGCAAATGGCAACCCTACCTATACTATTAAA
AATATAATGTTACATTTCGTATCTGAATGTTTAAATAATCACTTCATATTCTGTTGCAG

Domain e

ATTCTGCCCCACACAGATGATGGACACACTGAACCAGTGATGATTCGCAAAGATATCACACA
ATTGGACAAGCGTCAACAACCTGTCACTGGTGAAAGCCCTCGAGTCCATGAAAGCCGACCAT
TCATCTGATGGGTTCCAGGCAATCGCTTCCTTCCATGCTCTTCCTCCTCTTTGTCCATCAC
CAGCTGCTTCAAAGAGGTTTGCGTGCTGCGTCCATGGCATGCCAACCTTCCCGCAATG

25/29

Figure 9

Derived primary structure of KLH1

Domain b

GLPYWDWTEPMTHIPGLAGNKTYVDSHGASHTNPFHSSVIAFEENAPHTKRQIDQRLFKPA
TFGHHTDLFNQILYAFEQEDYCDFEVQFEITHNTIHAWTGGSEHFSMSSLHYTAFDPLFYF
HHSNVDRLWAVWQALQMRHKKPYRAHCAISLEHMHLPFAFSSPLNNNEKTHANAMPNKIY
DYENVLHYTYEDLTFFGGISLENIEKMIHENQQEDRIYAGFLLAGIRTSANVDIFIKTTSV
QHKAGTFAVLGGSKEMKWGFDRVFKFDITHVLKDLDLTADGDFEVTVDITEVDGTKLASSL
IPHASVIREHARGKLN

Domain c

VKFDKVPRLIRKKNVDRLSPEEMNELRKALALLKEDKSAGGFQQLGAFHGEPAKWCPSPEA
SKKFACCVHGMSPVPHWHRLTVQSENALRRHGYDGAALPYWDWTSPLNHLPELADHEKYVD
PEDGVEKHNPWFQDGHIDTVDKTTTRSVQNKLFQPEFGHYTSIAKQVLLALEQDNFCDFEI
QYEIAHNYIHALVGGGAQPYGMASLRYTAFDPLFYLHHSNTDRIWAIWQALQKYRGKPYNVA
NCAVTSMPREPLQPFGLSANINTDHVTKEHSVPFNVFDYKTNFNIEYDTLEFNGLSISQLNK
KLEAIKSQDRFFAGFLLSGFKKSSLVKFNICTDSSNCHPAGEFYLLGDENEMPWAYDRVFK
YDITEKLHDLKLHAEDHFYIDYEVFDLKPASLGKDLFKQPSVIEPRI

Domain d

GHHEGEVYQAEVTSANRIRKNIENLSLGELESLRAAFLEIENDGTYESIAKFHGSPGLCQL
NGNPISCCVHGMPFPHWHRLYVVVENALLKKGSSVAVPYWDWTKRIEHLPHLISDATYY
NSRQHHEYNPFHKGKITHENEITTRDPKDSLFSDFYEQVLYALEQDNFCDFEIQLEIL
HNALHSLGKGKYSMSNLDYAAFDPVFFLHHATTDRIWAIWQDLQFRKRPYREANCAIQ
LMHTPLQPFDKSDNDEATKTHATPHDGFYQNSFGYAYDNLELNHYSIPQLDHMLQERKR
HDRVFAGFLLHNIQTSADGHVFCVCLPTGEHTKDCSHEAGMFSILGGQTEMSFVFDRLYKLD
ITKALKKNGVHLQGDFFLEIEITAVNGSHLDSHVIHSPTILFEAG

Domain e

DSAHTDDGHTPEVMIRKDIQQLDKRQQLSLVKALESMKADHSSDGFQAIASFHALPPLCPS
PAASKRFACCVHGMPTFPQWHRLYTVQFQDSLKRGAVVGLPYWDWTLPR

26/29

Figure 10

KLH2 cDNA sequence and intron structure

Domain b

GGCCTGCCCTACTGGGATTGGACCATGCCAATGAGTCATTTGCCAGAACTGGCTACAAGTG
AGACCTACCTCGATCCAGTTACTGGGGAACTAAAAACAACCCTTTCCATCACGCCCAAGT
GGCGTTTGAAAATGGTGTAAACAAGCAGGAATCCTGATGCCAACTTTTTATGAAACCAACT
TACGGAGACCACACTTACCTCTTCGACAGCATGATCTACGCATTTGAGCAGGAAGACTTCT
GCGACTTTGAAGTCCAATATGAGCTCACGCATAATGCAATACATGCATGGGTTGGAGGCAG
TGAAAAGTATTCAATGTCTTCTCTTCACTacacTGCTTTTGATCCTATATTTTACCTCCAT
CACTCAAATGTTGATCGTCTCTGGGCCATTTGGCAAGCTCTTCAAATCAGGAGAGGCAAGT
CTTACAAGGCCCACTGCGCCTCGTCTCAAGAAAGAGAACCATTAAAGCCTTTTGCATTTCAG
TTCCCCACTGAACAACAACGAGAAAACGTACCACAACCTCTGTCCCCACTAACGTTTATGAC
TATGTGGGAGTTTTGCACTATCGATATGATGACCTTCAGTTTGGCGGTATGACCATGTGAG
AACTTGAGGAATATATTACACAAGCAGACACAACATGATAGAACCTTTGCAGGATTCTTCCT
TTCATATATTGGAACATCAGCAAGCGTAGATATCTTCATCAATCGAGAAGGTCATGATAAA
TACAAAGTGGGAAGTTTTGTAGTACTTGGTGGATCCAAAGAAATGAAATGGGGCTTTGATA
GAATGTACAAGTATGAGATCACTGAGGCTCTGAAGACGCTGAATGTTGCAGTGGATGATGG
GTTTCAGCATTACTGTTGAGATCACCGATGTTGATGGATCTCCCCCATCTGCAGATCTCATT
CCACCTCCTGCTATAATCtTTGaACGTGGTcATG

Intron 2b/c

AGGTATTTAAAAAAGTAATAAAACCcATTTTTTCGAATGCGCTTTATGAAATATCGTGTGAC
TGGTTCTTTAGTTTACATGGAGTGTAACAACATGCTCCATCAGTTGACATATACTGCTCAC
ACAAAGTAAGGGATATTTGATAATGATAACAAATATAATCAAAGCGGTTATACTATCAAGA
CTTATTCACATAATTACAGGTGAAGGGAGGTGTGATCGTGTTCACTGATCAGGTTGAGGCC
AGAGAAAGTCCAGTTTGAGTCTTGCGAGAAGATGATGTTTAGGCATGGGGTCGAATCACCAA
AATCACATGACTTCAATAACGGGTTGGACCACCTCGAGCGACgATGCAAGCAGTAGAGCGT
CTACGCATGCTCCTGATAAGGCGACCAATCTGTTCCCTGGGGAATCAGtCGCCACTCCTCTT
GTAGTGCCACGCTCATTTCTGCTACGGTCTGGGTACCTGCTATCGGgTCTTGATCCGTAT
CCCAAGGATGTCCACACATGTTCAAgGTGAGAGGTCGGGGAACATCGCTGGCCACGGTcA
GGtCTGAATTTGATGCCGTTGAAAGTGAGCTCTGACAACcTGAGCATGGtGAGCTCTGACG
TTGTGCTCCTGAAAGATGAATcCAGCTcCaTGaCAGCGAGCAAaGGGCAGGACGTGTTGGT
CAATGCAGTTGTCTCTGCAGTACACACCTGTCACTCGCCACTCACAAGCGTGTAGATCTGT
ACGACCAGTCATGGAGATCCCAGCCCACATCATAACGGACCCCTATCCATACCGATCATGA
GCCACCATAGCAGCGTCTTGATGACGTTCTCCCTGTGCGCTCGACATCCTcACACGGCCAA
AAGGAACGTGGACTCGTCACTGAACATGACATTAGCCAACCTGGCACTTGTCCACCGCTGA
TGTTGGCGAGACCATTCCAGTCGAGCTCTTCGGTGTCTGGCTTTTCATCGATAACACGACGT
AAGGTCTGCGGGCGTGAAGACGGCTCTATGCAGGCGATTTCGGATTGTCTGGGTGCTAAC
TCTGATCCCAGGTGCCTGCTGAAGTTGATGCTGGATCTGTGTGGCATTGAGATGGCGATTc
CTTAGGACTGTGGAGATGATGAATCGATCTTGACTTATGGTGGTGACATTAGGACGTCGGG
TTCGTGTCCTATCCTGCACCTCTTCCAGTTGTTTCGGTGACGCTCTGGTACCCGGCTGATTAC
TGACTGAGAATATCCATCTGCCGTGCGACATGAGCCTGTGTTGGCCCAGCCTGAAGCATTG
CAATCGCCAGAGACGCTCTTCAAAAGTCATTCGACGCATGGtTTTCTGTTACAAATGACA
GCGTAAAACAGtTTTTGGtGCTTTTATGCTTCCCAAGAGCATGAAAAACACGTTCTATgGG
TCgtGCACACCTTACATGACAAGtGtGAAAAGtGACTTGcACCCCCCTTgtGtGTTTCGGATG
CACACTCTGTTTACGTACTGATGCGATTTGGCGTCTAAACATGTTTTGGCGTCTAAACATG
TTTTCTGTCATGATTTCATATACTATTTTGTGTCATATTCCTGGCATCAAACCAAACCTACAGTG
AAATATATTTCAATATCCCCTACTTTGTGTGAGTAGTATAGATCACTGCAGACAACATATA

REPLACEMENT SHEET NO. 27

27/29

GACAAtGCAGtTaCaCCGTCAACAATCCCAGTCATTAATTATGATGaCaCTTCCACACATA
GIGTCAGTGATTGTAATTCAaCTGTACACACTTTTCCCGTGAACATTTCAGGATCTATATGA
CTAAATATATAACATTAGTATACGTGCAGTTTGTATCGCTACGACATTGTTGTAACCTCTT
TGTTTAATCATTTaACAG

Domain c

CTGATGCCAAAGaCTTTGgCCATAGCAGAAAAATCAGgAAAGcCGTTGATTcTcTGACAGT
CgAAGAACAAAcTTCGTTGAGgCGAGcTATGgCAGATcTACAGGACGACAAAACATCAGGG
GGTTTCCAGCAGATTGCAGCATTCACGGAGAACC AAAATGGTGTCCAAGCCCCgAAGCGG
AGAAAAAATTTGCATGCTGTGTTTCATGGAATGGCTGTTTTCCCTCACTGGCACAGATTGCT
GACAGTTCAAGGAGAAAAATGCTCTGAGGAAACATGGCTTTACTGGTGGACTGCCCTACTGG
GACTGGACTCGATCAATGAGCGCCCTTCCACATTTTGTGCTGATCCTACTTACAATGATG
CTATTTCCAGCCAGGAAGAAGATAACCCATGGCATCATGGTCACATAGACTCTGTTGGGCA
TGATACTACAAGAGATGTGCGTGATGATCTTTATCAATCTCCTGGTTTCGGTCACTACACA
GATATTGCACAACAAGTCCTTCTGGCCTTTGAGCAGGACAGTTTCTGTGATTTTGAGGTAC
AATTTGAAATTGCCCAT AATTTCATACATGCACTGATTGGTGGAACGAACCATACAGTAT
GTCATCTTTGAGGTATACATACGATCCAATCTTCTTCTTGCAACCACTCCAGTACAGAC
CGACTTTGGCCATCTGGCAAGCAATCACTAGTGCGGCCGCCCTGCAGGTGACCAT AAGGG
AGAGCTCCCAACGCgtTGGAtGCAATCT

Domain g

ATGGCTGTGTTTCCGCACTGGCACAGACTGTTTGTGAAACAGATGGAGGACGCACTTGCTG
CTCATGGAGCTCATATTGGCATACCATACTGGGATTGGACAAGTGCGTTTAGTCATCTGCC
CGCCCTAGTGACTGACCACGAGAACAATCCCTTCCACCAC

Intron g(2)

GTATGTGTCAAATCGTTTTAGGAACTGCCTTATCCATTTTACAATTACGAGTACAAAATGA
AAACGGAAACTGTGTGACCTCGAAAAGTGCAATCTTTAAAGGATGCAATGTACACAATAAA
ATGCTCCGATCAAAGCGATGGCTAGAAATCATTTTCCCTCTAATTCCCTTTCACACAGCT
CGGTTTCGTTTTAAGTAGGAACAAGTCTCTGCAAAAACATCACAAATAAAGAGAACACAGAA
AAAACCTCATTCTCGTTTCTGTATTCCGAAAATGAAATTTACAATTTCTTTTCAATTTATAG

Domain g

GGCCATATTGGTCATCTGAATGTGGATACATCTCGATCTCCAAGAGACATGCTGTTTAATG
ATCCTGAACAAGGCTCAGAATCATTCTTCTACAGACAGGTTCTCTTGACTCTAGAACAGAC
AGACTTCTGCCAATTTGAAGTTCAGTTTGAACCTTACACACAATGCCATCCACTCTTGACT
GGAGGACATACTCCATATGGAATGTCATCACTGGAATATACAGCATATGATCCACTCTTTT
ATCTCCACCATTCCAACACTGATCGTATCTGGGCCATCTGGCAGGCACTCCAGAAATATAG
AGGTCTTCCATACAACGCAGCTCACTGCGATATccaagttctgaaacaacctCTTAAACCA
TTCAGCGAGTCCAGGAATCCAAACCCAGTCACCAGAGCCAATTCTAGGGCCGTTGATT CAT
TTGATTATGAGAAATTCAATTATCAATATGACACACTTACCTTCCACGGACTTCTATCCC
AGA ACTTGATGCCATGCTTCAAGAGAGAAAGAAGGAAGAGAGAACATTTGCAGCCTTCCTG
TTGCACGGATTTGGCGCCAGTGCTGATGTTTCGTTTGATGTCTGCACACCTGATGGTCATT
GTGCCTTTGCTGGAACCTTCGCGGTACTTGGTGGGGAGCTTGAGATGCCCTGGTCCTTTGA
AAGATTGTTCCGTTACGATATCACAAAGGTTCTCAAGCAGATGAATCTTCACTATGATTCT
GAGTTCCACTTTGAGTTGAAGATTGTTGGCACAGATGGAACAGAACTGCCATCGGATCGTA
TCAAGAGCCCTACCATTGAACACCATGGAGGAG

REPLACEMENT SHEET NO. 28

28/29

Intron g/h

GTATGTTTTGAGATCCACATAATCTTCTACCCTGTCTCATTTCTAATGCTCTTCAATACAC
AATTTATATAGCCTTTGAGCTTCAGATGTATTACGGACAGGCATTACAGTATACATGTAAT
ATGGTTTTCTGCTATTTGCAAAAATTGTGTCCTATCTCTGTTTCAGATCATCATGGCGGTGA
CACCTAG

Domain h

GTCACGATCACAGTGAACGTCACGATGGATTTTTTCAGGAAGGAAGTCGGTTCCCTGTCCCT
GGATGAAGCCAATGACCTTAAAAATGCACTGTACAAGCTGCAGAATGATCAGGGTCCCAAT
GGATATGAATCAATAGCCGGTTACCATGGCTATCCATTCTCTGCCCTGAACATGGTGAAG
ACCAGTACGCATGCTGTGTCCACGGAATGCCTGTATTTCCACATTGGCACAGACTTCATAC
AATCCAGTTTGAGAGAGCTCTCAAAGAACATGGTTCTCATTTGGGTCTGCCATACTGGGAC
TGGAC

29/29

Figure 11

Derived primary structure of KLH2

Domain b

GLPYWDWTMPMSHLP ELATSETYLD PVTGETKNNPFHHAQVAFENGVT SRNPDAKL FMKPT
YGDHTYLFDSMIYAFEQEDFCDFEVQYELTHNAI HAWVGGSEKYSMSSSLHYTAFDPIFY LH
HSNVDRLWAIWQALQIRRGKSYKAHCASSQEREPLKPF AFSSPLNNNEKTYHNSVPTNVYD
YVGVLHYRYDDLQFGGMTMSELEEYIHKQTQHDRTFAGFFLSYIGTSASVDIFINREGHDK
YKVGSSFVVLGGSKEMKWGFDRMYKYEITEALKTLNVAVDDGFSITVEITDVDGSPPSADLI
PPPAIIFERGH A

Domain c

DAKDFGHSRKIRKA VDSLTVEEQTS LRRAMADLQDDKTS GGGFQQIAAFHGE PKWCPSPEAE
KKFACCVHGM AVFPHWHRLLT VQGENALRKHGFTGGLPYWDWTRSMSALPHFVADPTYNDA
ISSQEEDNPWHHGHIDSVGHDTTRDVRDDLQSPGFGHYTDIAQQVLLAFEQDSFCDFEVQ
FEIAHNFIHALIGGNEPYSMS SLRYTTYDPIFFLHHSSTDRLWAIWQALQKYRGKPYNTAN
CAIASMRKPLQPFGLDSVINPDDETREHSVPFRVFDYKNNFDY EYESLAFNGLSIAQLDRE
LQRRKSHDRVFAGFLLHEIGQSAKHNVSDCDHYAGEFYILGDEAEMPWRYDRVYKYEITQQ
LHDLDLHVGDNFFLKYEA FDLNGGSLGGSIFSQPSVIFEPAAGMF

Domain d

GSHQADEYREAVTSASHIRKNIRD LSEGEIESIRSAFLQIQKEGIYENIAKFHGKPGLC EH
DGHPVACCVHGMPTFPHWHRLYVLQVENALLERGS AVAVPYWDWTLPR

Domain g

MAVFPWHRL FVKQMEDALAAHGAHIGIPYWDWTS AFSHLPALVTDHENNPFHHGHIGHLN
VDTSRSPRDM LFNDPEQGSSEFFYRQVLLTLEQTDFCQFEVQFELTHNAIHSWTGGHTPYG
MSSLEYTAYDPLFY LHHSNTDRIWAIWQALQKYRGLPYNAAHCDIQVLKQPLKPFSES RNP
NPVTRANSRAVDSFDYEKFNYQYDTLT FHGLSIPELDAMLQERKKEERTFAAFL LHGFGAS
ADV SFDVCTPDGHCAFAGTFAVLGGELEMPWSFERLFRYDITKVLKQMN LHVDSEFHFELK
IVGTDGTELP SDRIKSPTIEHHGG

Domain h

GHDHSE RHDGFFRKEVGSLSLDEANDLKNALYKLQNDQGPNGYESIAGYHGY PFLCPEHGE
DQYACCVHGM PVFPHWHRLHTIQFERALKEHGSHLGLPYWDW